DETAILED ACTION

This is a supplemental examiner's amendment to make minor corrections.

SUPPLEMENTAL EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Steve Mendelsohn (Reg. No. 35,951) on 5/7/09.

2. The claims are to be amended as follows:

Claims 3,23, and 42: CANCEL. Regarding claim 42, the applicant cancelled claims 41-42 but failed to remove claim 42 from the claim listing. It needs to be removed from the claim listing.

Claims 4-19, line 1: delete "invention" and insert in its place - - method - - .

Claims 4 and 6, line 1: after "claim", delete "3" and insert - - 1 - -.

Claims 24-33,35-40, line 1: delete "invention" and insert in its place - - apparatus - - .

Claims 24 and 25, line 1: after "claim", delete "23" and insert - - 21 - -.

Claims 46-47,52,54,55,57-59, line 1: delete "invention" and insert in its place - - apparatus - - .

Claim 1 is to be amended to recite :

A method for synthesizing an auditory scene comprising: processing at least one input channel to generate two or more processed input signals; filtering the at least one input channel ~~**with a filter or analysis filterbank**~~ to generate two or more diffuse signals; and combining the two or more diffuse signals with the two or more processed input signals to generate a plurality of output channels for the auditory scene, , wherein processing the at least one input channel comprises: converting the at least one input channel from a time domain into a frequency domain to generate a plurality of frequency-domain (FD) input signals; delaying the FD input signals to generate a plurality of delayed FD signals; and scaling the delayed FD signals to generate a plurality of scaled, delayed FD signals, and **wherein: the FD input signals are delayed based on inter-channel time difference (ICTD) data; and the delayed FD signals are scaled based on inter-channel level difference (ICLD) and inter-channel correlation (ICC) data.**

Claim 21 is to be amended as follows:

21. Apparatus for synthesizing an auditory scene, comprising: a configuration of at least one time domain to frequency domain (TD-FD) converter and a plurality of filters, the configuration adapted to generate two or more processed FD input signals and two or more diffuse FD signals from at least one TD input channel; two or more combiners adapted to combine the two or more diffuse FD signals with the two or more processed FD input signals to generate a plurality of synthesized FD signals; and two or more frequency domain to time domain (FD-TD) converters adapted to convert the synthesized FD signals into a plurality of TD output channels for the auditory scene, wherein the configuration comprises: a first TD-FD converter adapted to convert the at least one TD input channel into a plurality of FD input signals; a plurality of delay nodes adapted to delay the FD input signals to generate a plurality of delayed FD signals; and a plurality of multipliers adapted to scale the delayed FD signals to generate a plurality of scaled, delayed FD signals, wherein the apparatus is adapted to generate more than tow output channels from the at least one TD input channel, **and wherein: the delay nodes are adapted to delay the FD input signals based on inter-channel time difference (ICTD) data; and the multipliers are adapted to scale the delayed FD signals based on inter-channel level difference (ICLD) and inter-channel correlation (ICC) data.**

Claim 53 is to be amended as follows:

Apparatus for synthesizing an auditory scene, comprising:

a configuration of at least one time domain to frequency domain (TD-FD) converter and

a plurality of filters, the configuration adapted to generate two or more processed FD input signals and two or more diffuse FD signals from at least one TD input channel;

two or more combiners adapted to combine the two or more diffuse FD signals with the two or more processed FD input signals to generate a plurality of synthesized FD signals; and two or more frequency domain to time domain (FD-TD) converters adapted to convert the synthesized FD signals into a plurality of TD output channels for the auditory scene, wherein:

the configuration comprises:

a first TD-FD converter adapted to convert the at least one TD input channel into a plurality of FD input signals;

a plurality of delay nodes adapted to delay the FD input signals to generate a plurality of delayed FD signals; and

a plurality of multipliers adapted to scale the delayed FD signals to generate a plurality of scaled, delayed FD signals;

the combiners are adapted to sum, for each output channel, one of the scaled, delayed FD signals and a corresponding one of the diffuse FD signals to generate one of the synthesized FD signals;

each filter is a TD late reverberation filter adapted to generate a different TD diffuse channel from the at least one TD input channel; and

~~the configuration comprises, for each output channel in the auditory scene:~~

~~another TD-FD converter adapted to convert a corresponding TD diffuse channel into an FD diffuse signal; and~~

an other multiplier adapted to scale the FD diffuse signal to generate a scaled FD

diffuse signal, wherein a corresponding combiner is adapted to combine the scaled FD diffuse signal with a corresponding one of the scaled, delayed FD signals to generate one of the synthesized FD signals **; and**

wherein each other multiplier is adapted to scale the FD diffuse signal based on ICLD and ICC data.

Claim 54 is to be amended as follows:

The invention of claim 53, wherein:

~~each other multiplier is adapted to scale the FD diffuse signal based on ICLD and ICC data;~~
the at least one input channel is at least one combined channel generated by performing BCC coding on an original auditory scene; and the ICLD and ICC data are cue codes derived during the BCC coding of the original auditory scene.

Claim 56 is to be amended as follows:

56.Apparatus for synthesizing an auditory scene, comprising:

a configuration of at least one time domain to frequency domain (TD-FD) converter and a plurality of filters, the configuration adapted to generate two or more processed FD input signals and two or more diffuse FD signals from at least one TD input channel; two or more combiners adapted to combine the two or more diffuse FD signals with the two or more processed FD input signals to generate a plurality of synthesized FD signals; and two or more frequency domain to time domain (FD-TD) converters adapted to convert the synthesized FD signals into a plurality of TD output channels for the

auditory scene, wherein:

the configuration comprises:

a first TD-FD converter adapted to convert the at least one TD input channel into a plurality of FD input signals;

a plurality of delay nodes adapted to delay the FD input signals to generate a plurality of delayed FD signals; and

a plurality of multipliers adapted to scale the delayed FD signals to generate a plurality of scaled, delayed FD signals;

the combiners are adapted to sum, for each output channel, one of the scaled, delayed FD signals and a corresponding one of the diffuse FD signals to generate one of the synthesized FD signals; each filter is an FD late reverberation filter adapted to generate a different FD diffuse signal from one of the FD input signals; and

the configuration further comprises a further plurality of multipliers adapted to scale the FD diffuse signals to generate a plurality of scaled FD diffuse signals, wherein the combiners are adapted to combine the scaled FD diffuse signals with the scaled, delayed FD signals to generate the synthesized FD signals **; and wherein each other multiplier is adapted to scale the FD diffuse signal based on ICLD and ICC data.**

Claim 58 is to be amended as follows:

The invention of claim 56, wherein:

~~the FD diffuse signals are scaled based on ICLD and ICC data;~~
the at least one input channel is at least one combined channel generated by performing BCC

coding on an original auditory scene; and

the ICLD and ICC data are cue codes derived during the BCC coding of the original auditory

scene.

Claim 60 is to be amended as follows:

60. Apparatus for synthesizing an auditory scene, comprising:

a configuration of at least one time domain to frequency domain (TD-FD) converter and a plurality of filters, the configuration adapted to generate two or more processed FD input signals and two or more diffuse FD signals from at least one TD input channel; two or more combiners adapted to combine the two or more diffuse FD signals with the two or more processed FD input signals to generate a plurality of synthesized FD signals; and two or more frequency domain to time domain (FD-TD) converters adapted to convert the synthesized FD signals into a plurality of TD output channels for the auditory scene, wherein:

the configuration comprises:

a first TD-FD converter adapted to convert the at least one TD input channel into a plurality of FD input signals;

a plurality of delay nodes adapted to delay the FD input signals to generate a plurality of delayed FD signals; and

a plurality of multipliers adapted to scale the delayed FD signals to generate a plurality of scaled, delayed FD signals;

the combiners are adapted to sum, for each output channel, one of the scaled, delayed FD signals and a corresponding one of the diffuse FD signals to generate one of the synthesized FD signals;

and the apparatus comprises one filter for every output channel in the auditory scene, **and wherein: the delay nodes are adapted to delay the FD input signals based on inter-channel time difference (ICTD) data; and the multipliers are adapted to scale the delayed FD signals based on inter-channel level difference (ICLD) and inter-channel correlation (ICC) data.**

Claim 61 is to be amended as follows:

61. Apparatus for synthesizing an auditory scene, comprising:

a configuration of at least one time domain to frequency domain (TD-FD) converter and a plurality of filters, the configuration adapted to generate two or more processed FD input signals and two or more diffuse FD signals from at least one TD input channel;

two or more combiners adapted to combine the two or more diffuse FD signals with the two or more processed FD input signals to generate a plurality of synthesized FD signals; and two or more frequency domain to time domain (FD-TD) converters adapted to convert the synthesized FD signals into a plurality of TD output channels for the auditory scene, wherein: the configuration comprises:

a first TD-FD converter adapted to convert the at least one TD input channel into a plurality of FD input signals;

a plurality of delay nodes adapted to delay the FD input signals to generate a plurality of delayed FD signals; and

a plurality of multipliers adapted to scale the delayed FD signals to generate a plurality of scaled, delayed FD signals;

the combiners are adapted to sum, for each output channel, one of the scaled, delayed FD signals and a corresponding one of the diffuse FD signals to generate one of the synthesized FD signals;

each filter has a random frequency response with a flat spectral envelope, **and wherein: the delay nodes are adapted to delay the FD input signals based on inter-channel time difference (ICTD) data; and the multipliers are adapted to scale the delayed FD signals based on inter-channel level difference (ICLD) and inter-channel correlation (ICC) data.**

Allowable Subject Matter

3. Claims 1,4-19,21,24-25,27-33,35-40,43-47,51-61 are allowed.

4. The following is an examiner's statement of reasons for allowance: Regarding claims 1 21,and 43 prior art Lowe (US 5,371,799).discloses a method of synthesizing an auditory scene, comprising processing at least one input channel to generate two or more processed input signals (Figure 5, input audio sample is fed in through terminal 90 to be processed through azimuth processor 92 and two or more processed input signals are generated; column 5, lines 49-57);filtering the at least one input channel to generate

two or more diffuse signals (range processor 102, filters the input channel and performs processing on the early reflections part of the audio signal to generate two or more diffused signals; Figure 5; column 6, lines 7-14); combining the two or more diffuse signals with the two or more processed input signals to generate a plurality of output channels for the auditory scene (adders 98 and 100, Figure 5), wherein: the method generates more than two output channels from the at least one input channel (Figure 5).Lowe discloses that the method synthesizes a stereo sound auditory scene.

5. Regarding claims 45,51,53,56,60 and 61, prior art Budnikov et al. (US 2005/0069143) discloses a configuration of at least one time domain to frequency domain (TD-FD) converter (FFT , 212, Figure 2) and a plurality of filters (source image processors 216a-216n operate to apply an appropriate one of filters 215a -215n to each of the selected transformed window that has been matched to a reverberation path and that has been assigned for processing by a source image processing kernel; processing is performed in accordance with parameters established by the filter that corresponds to the reverberation path; page 3, ¶ 0028 -¶ 0030), the configuration adapted to generate two or more processed FD input signals and two or more diffuse signals from at least one TD input channel; two or more combiners adapted to combined the two or more diffuse FD signals with the two or more processed FD input signals to generate a plurality of synthesized FD signals (each of the plurality of source image processors 216a-216n reads on combiners, Figure 2; page 3, ¶ 0028 -¶ 0030); and two or more frequency domain to time domain (FD-TD) converters adapted to convert the synthesized FD signals into a plurality of TD output channels for the auditory scene

(IFFT, 217c, 218c; page 4, ¶ 0034- ¶ 0035 discloses that the output is coupled to a loudspeaker system, headphone set or other audio display devices).Budnikov discloses that the method synthesizes a stereo sound auditory scene and that the output can be a loudspeaker system (page 4, ¶ 0035).

Regarding claim 1, the prior art or combination thereof fails to disclose or make obvious the FD input signals are delayed based on inter-channel time difference (ICTD) data; and the delayed FD signals are scaled based on inter-channel level difference (ICLD) and inter-channel correlation (ICC) data..

Regarding claims 43 and 51, the prior art or combination thereof fails to disclose or make obvious the method applies the processing , filtering, and combining for input channel frequencies less than a specified threshold frequency and applies alternative auditory scene analysis processing for input channel frequencies greater than the specified threshold frequency (claim 43) and the apparatus is adapted to generate, combine, and convert for TD input channel frequencies less than a specified threshold frequency and the apparatus is further adapted to apply alternative auditory scene synthesis processing for input channel frequencies greater than the specified threshold frequencies (claim 51).

Regarding claims 21,45,60 and 61, the prior art or combination thereof fails to disclose or make obvious the delay nodes are adapted to delay the FD input signals based on inter-channel time difference data and the multipliers are adapted to scale the delayed FD signals based on inter-channel level difference and inter-channel correlation data.

Regarding claims 53 and 56, the prior art or combination thereof fails to disclose or make obvious the invention as a whole and wherein each other multiplier is adapted to scale the FD diffuse signal based on ICLD and ICC data.

6. Claims 4-19,24,25,27-33,35-40,44,46,47,52,54,55,57-59 are allowed due to dependency on claims 1,21,43,45,51,53,56,60 and 61.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVONA E. FAULK whose telephone number is (571)272-7515. The examiner can normally be reached on 8 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devona E. Faulk/
Primary Examiner, Art Unit 2614